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**Amy Veprauskas\*** (aveprauskas@louisiana.edu), **Azmy S. Ackleh**, **Ross A. Chiquet** and **Tingting Tang**. *Assessing the effect of environmental disturbances on population recovery and persistence with application to marine mammals.*

We develop nonautonomous matrix models to examine the possible long-term effects of environmental disturbances, such as oils spills, floods, and fires, on population recovery and persistence. We first examine population recovery following a single disturbance, where recovery is defined to be the return to the pre-disturbance population size. We assume that the disturbance results in reductions in either survival or fecundity for a period of time, after which the vital rates recover to their original values. Using this model formulation, we apply matrix calculus methods to derive explicit formulas for the sensitivity of the recovery time with respect to properties of the population or the disturbance. We then develop a model to consider the effect of repeated disturbances on population persistence. Disturbances occur stochastically according to a two-state Markov chain with their frequency depending on the average length of effect of a disturbance and the average time between disturbances. Motivated by the 2010 Deepwater Horizon oil spill, we apply the results of both models to examine the possible response of a sperm whale population to environmental disturbances. (Received September 24, 2017)